IN THE CLAIMS:

This version of the claims replaces and supercedes all prior versions of the claims.

1. (Currently Amended) A demodulation circuit for demodulating a digital transmission signal having improved power consumption levels and sampling frequency for an analog-to digital (A/D) converting means wherein

a known signal is inserted in said digital transmission signal at transmission,

said demodulation circuit comprising:

said A/D converting means for performing A/D conversion of a base band signal obtained by demodulation of said digital transmission signal; and

phase shifting means for repeatedly varying a phase shift of one of said digital transmission signal and said base band signal before digital conversion by said A/D converting means on the basis of a comparison between said known signal after digital conversion by said A/D converting means and prior to a parallel-to-serial (P/S) conversion ~~and~~ with said known signal that was inserted at transmission.

2. (Previously Amended) A demodulation circuit as set forth in claim 1, which further comprises orthogonal demodulating means for performing orthogonal demodulation of said digital transmission signal formed with an orthogonal modulated signal,

said A/D converting means includes two A/D converters for performing A/D conversion of two base band signals demodulated by said orthogonal demodulating means and having demodulated phases mutually offset for right angle,

symbol judgment portion for making judgment of symbols of digital signals converted by said two A/D converters,

said phase shifting means including comparing portion for comparing said known signal, for which symbol judgment is performed by said symbol judgment portion with said known signal inserted at transmission, and a phase shifter for causing phase shift of said base band signal on the basis of a result of comparison by said comparing portion.

3. (Currently Amended) A demodulation circuit for demodulating a digital transmission signal having improved power consumption levels and sampling frequency for an analog-to digital (A/D) converting means, said demodulation circuit having demodulating means for performing orthogonal demodulation of said digital transmission signal formed with an orthogonal modulated signal; wherein a known signal is inserted in said digital transmission signal at transmission said demodulation circuit comprising:

said A/D converting means includes two A/D converters for performing A/D conversion of two base band signals demodulated by said orthogonal demodulating means and having demodulated phases of mutually offset for right angle,

a symbol judgment portion for making judgment of symbols of digital signals converted by said two A/D converters,

~~said~~ phase shifting means including a parallel-to-serial P/S converter for digital signal~~,~~ outputted by the symbol judgment portion, a comparing portion for comparing said digital signal serial converted by said P/S converter with said known signal inserted at transmission and a phase shifter for repeatedly varying a phase shift of

said base band signal before digital conversion by said A/D converting means on the basis of a result of comparison by said comparing portion.

4. (Previously Amended) A demodulation circuit as set forth in claim 3, which further comprises reception data processing portion obtaining an information data by removing said known signal from the signal converted into a serial data by said P/S converter.

5. (Previously Amended) A demodulation circuit as set forth in claim 1, which further comprises orthogonal demodulating means for performing orthogonal demodulation of said digital transmission signal formed with an orthogonal modulated signal,

said A/D converting means includes two A/D converters for performing A/D conversion of two base band signals demodulated by said orthogonal demodulating means and having demodulated phases mutually offset for right angle,

a symbol judgment portion for making judgment of symbols of digital signals converted by said two A/D converters,

said phase shifting means including comparing portion for comparing said known signal, for which symbol judgment is performed by said symbol judgment portion with said known signal inserted at transmission, and a phase shifter for causing phase shift of said digital transmission signal on the basis of a result of comparison by said comparing portion.

6. (Currently Amended) A demodulation circuit as set forth in claim 1, wherein said phase shifting means modifies shifting amounts of a plurality of phase shifting elements

for N times (in which N is an integer greater than or equal to one) where the phase shift equals $\Delta\theta^{*}_{n}$ (in which n is in the range of 1 to N) and a comparison means compares said known signal after digital conversion by said A/D converting means and said known signal inserted at transmission for each of said N times and a result from said comparison means is stored in a memory means for each of said N times and a second comparison means for comparing each of the N results from said comparison means ~~compares each of the results from said comparison means for N times~~.

7. (Previously Presented) A demodulation circuit as set forth in claim 6, wherein said phase shifting means causes phase shift to a phase where a correlation value of said known signal inserted at transmission and said known signal after digital conversion by said A/D converting means becomes the highest.

8. (Previously Presented) A demodulation circuit as set forth in claim 6, wherein said phase shifting means repeats a process for N times for M times, in which M is positive integer to take an average value of optimal phase shifting amount for M times as a final optimal phase shifting amount.

9. (Previously Amended) A demodulation circuit as set forth in claim 1, wherein said digital transmission signal is a signal, in which an information data and said known signal are time multiplexed.

10. (Previously Presented) A demodulation circuit as set forth in claim 1, wherein said digital transmission signal has two base band signals having phases mutually shifted for 90°, in which an information data is assigned for one of said base band signals and said known signal is assigned to the other base band signal.

11. (Withdrawn) A modulation circuit for modulating a digital signal comprising:

known signal inserting means for inserting a preliminarily known signal to said digital signal; and

modulating means for modulating the digital signal after insertion of said known signal.

12. (Withdrawn) A modulation circuit as set forth in claim 11, wherein said modulating means is an orthogonal modulator.

13. (Withdrawn) A modulation circuit as set forth in claim 11, wherein said known signal inserting means inserting means inserts said known signal to said digital signal in the time multiplexing.

14. (Withdrawn) A modulation circuit as set forth in claim 11, wherein said known signal inserting means assigns information data to one of two digital signals which are modulated to have phases mutually shifted for 90° and said known signal to the other digital signal.

15. (Currently Amended) A demodulation method for demodulating a digital transmission signal having improved power consumption levels and sampling frequency for an analog-to-digital (A/D) converting means wherein

a known signal is inserted in said digital transmission signal at transmission

said demodulation method comprising:

(a) performing A/D conversion of a base band signal obtained by demodulation of said digital transmission signal;

(b) comparing said known signal after digital conversion prior to parallel-to-serial (P/S) conversion ~~and~~ with said known signal inserted at transmission; and

(c) varying a phase shift of one of said digital transmission signal and said base band signal before digital conversion by said A/D converting means on the basis of said comparing.

16. (Previously Presented) A demodulation method as set forth in claim 15, which further comprises performing orthogonal demodulation of said digital transmission signal formed with an orthogonal modulated signal,

wherein (a) further includes performing A/D conversion of two base band signals and having demodulated phases mutually offset for 90°, and making judgment of symbols of digital signals converted by ~~said~~ two A/D converters, and (b) further includes comparing the known signal, for which symbol judgment is performed with said known signal inserted at transmission, and varying a phase shift of said base band signal on the basis of a result of comparing.

17. (Currently Amended) A demodulation method for demodulating a digital transmission signal having improved power consumption levels and sampling frequency for an analog-to-digital (A/D) converting means for performing orthogonal demodulation of said digital transmission signal formed with an orthogonal modulated signal~~,~~ wherein

a known signal is inserted in said digital transmission signal at transmission

said demodulation method comprising,

(a) performing A/D conversion of two base band signals demodulated ~~by~~ by a demodulation step and having demodulated phases mutually offset for 90°, and making judgment of symbols of digital signals converted by two A/D converters;

(b) converting a digital signal, for which symbol judgment is performed by said symbol judgment portion, using a parallel-to-serial (P/S) converter;

(c) comparing said known signal serial converted by said P/S converter with said known signal inserted at transmission; and

(d) varying a phase shift of said base band signal before digital conversion by said A/D converting means on the basis of a result of said comparing.

18. (Previously Presented) A demodulation method as set forth in claim 17, which further comprises obtaining an information data by removing said known signal from the signal converted into a serial data.

19. (Previously Presented) A demodulation method as set forth in claim 15, which further comprises performing orthogonal demodulation of said digital transmission signal formed with an orthogonal modulated signal,

wherein (a) further includes performing A/D conversion of two base band signals and having demodulated phases mutually offset for 90°, and making judgment of symbols of digital signals converted by two A/D converters, and (b) further includes comparing ~~a~~ the known signal, for which symbol judgment is performed with said known signal inserted at transmission, and varying a phase shift of said digital transmission signal on the basis of a result of comparing.

20. (Currently Amended) A demodulation method as set forth in claim 15, wherein said method further includes

(a) modifying shifting amounts of a plurality of phase shifting elements for N times (in which N is an integer greater than or equal to one where the phase shift equals $\Delta\theta\underline{*}_{n}$ (in which n is an integer from 1 to N);

(b) comparing said known signal after digital conversion by said A/D converting means and said known signal inserted at transmission for each of said N times;

(c) storing a result of the comparing in a memory means for each of said N times; and

(d) comparing each of the N results from the comparing in step (b) and storing in step (c).

21. (Previously Presented) A demodulation method as set forth in claim 20, wherein step (d) further comprising varying the phase shift to a phase where a correlation value of said known signal inserted at transmission and said known signal after digital conversion becomes the highest.

22. (Previously Presented) A demodulation method as set forth in claim 20, wherein said steps (b) through (d) is repeated for M times, in which M is positive integer to take an average value of optimal phase shifting amount for M times as a final optimal phase shifting amount.

23. (Previously Presented) A demodulation method as set forth in claim 15, wherein said digital transmission signal is a signal, in which an information data and said known signal are time multiplexed.

24. (Previously Presented) A demodulation method as set forth in clam 15, wherein said digital transmission signal has two base band signals having phases mutually shifted for 90°, in which an information data is assigned for one of said base band signals and said known signal is assigned to the other base band signal.

25. (Withdrawn) A modulation circuit for modulating a digital signal comprising:

fifth step of interring a preliminarily known signal to said digital signal;

and

sixth step of modulating the digital signal after insertion of said known signal.

26. (Withdrawn) A modulation method as set forth in claim 25, wherein said modulating means is an orthogonal modulator.

27. (Withdrawn) A modulation method as set fort in claim 25, wherein said fifth means inserts said known signal to said digital signal in time multiplexing.

28. (Withdrawn) A modulation method as set forth in claim 25, wherein said fifth step gassings information data to one of two digital signals which are modulated to have phases mutually shifted for 90° and said known signal to the other digital signal.

29. (New) A demodulation circuit comprising:

a receiver, which receives a signal including a known signal and outputs a digital transmission signal;

a demodulator, which demodulates said digital transmission signal and outputs a base band signal;

an analog-to-digital (A/D) converter, which converts said base band signal;

a comparing circuit, which compares said known signal with a stored signal; and

a phase shifter, which shifts a phase of one of said digital transmission signal and said base band signal on the basis of the result of comparison made by said comparing circuit.

30. (New) A demodulation method comprising:

receiving a signal including a known signal and outputting a digital transmission signal;

demodulating said digital transmission signal and outputting a base band signal;

converting said base band signal using an analog-to-digital (A/D) converter;

comparing said known signal with a stored signal; and

shifting a phase of one of said digital transmission signal and said base band signal on the basis of the said comparing.